

Rope Access Maneuvers 2 (SPRAT 2)



2.1 Ascent Rescue

- Pre-rig doubled carabiner on to ID for rescue pick
- Approach casualty and perform ABC's
- Pass backup device over casualties ID (ASAP)
- Ascend as high as possible, pushing up the casualty's backup device
- Transfer to descent mode
- Attach the pick sling to the casualty's sternal D ring
- Attach the casualty to the rescuers waist D ring with their spare lanyard (trace the same rope as the pick sling to keep from tangling on advanced rescues)
- Remove the casualty's backup device
- Set the ASAP at eye height
- Rad up to tension the pick sling (if needed)
- Remove the casualty's ascender
- Transfer rescuers handled ascender on to backup rope and perform the mini 2:1 pick
- This technique uses the casualty's footloop from their handled ascender, down through the chest point and through the carabiner on the handled ascender. It creates a very small 2:1. To lower the casualty they will use one hand to lower and the other to pinch the strands together and create friction.
- Clear the ropes with load to the R and backup to the L
- Unlock the ASAP and put shock pack over the shoulder to keep high
- Attach added friction carabiner to account for the 2 person load
- Descend to ground

2.2 Short Haul Rescue 2:1

This method may be necessary when the rescue is performed low down while on very long ropes
Same initial steps as below until the casualties backup device is removed

- Attach a pulley on the rope coming from the rescuers handled ascender. Attach this pulley to the high point of the ascender
- Use the casualty's handled ascender and footloop on the rope below the pulley. Slide the haul system as high as possible
- Stand in the casualty's footloop and raise the casualty upwards. Continue until there is tension on the casualty's harness
- Reach down and pull up on the casualty's harness (waist or chest) until tension is taken off the chest ascender and it can be released
- Lock off the descender and disconnect the pulley system
- Clear the ropes with load to the R and backup to the L
- Unlock the ASAP and put shock pack over the shoulder to keep high
- Attach added friction carabiner to account for the 2 person load
- Descend to ground

2.3 Exiting to Anchor Points

This maneuver is not the same as going in to an aid traverse. Its purpose is to exit the ropes to anchors to break in to tensioned ropes or to become a casualty for the aid pick-off rescue. In this maneuver it is important to remove backup devices to free them up for advanced rescues.

- Ascend to anchor points
- Attach spare lanyard to backup anchor
- Attach sternal lanyard to main anchor
- Stand and transfer chest ascender from main (climbing) rope to backup lanyard
- Clean up system

2.4 Rescues from Above

This method may be necessary if the rescuer is working above the casualty and the safe area is on the ground. A spare set of rescue ropes should always be considered for any rescue. These rescues in particular are made faster and safer with a second set of ropes.

2.6 Lowers

Materials or personnel may be lowered and raised on rope systems. When lowering or raising simple loads with no potential to drop on to people or materials below a single rope system may be used.

If the load is live (human) or there is potential to drop the load on to a human a second backup must be used.

Loads may be lowered from the ID device. This device may be used to lower 150kg type loads (human weight approx.). The ID is rigged from an anchor and the rope must be run across the flange beside the rope slot. This is made easier by redirecting the rope through an anchor plate or through a second carabiner.

Backup devices for lowers may be Shunts, Buddies, Backups or the ASAP. Take care in rigging these as it is easy to rig them in the opposite direction. The ID may also be used as a backup device and works very well when the anchors are very close together and the devices can be operated simultaneously

Many other devices may be used to lower and raise loads. These devices involve specialized training. If loads are heavier than 150kg specialized load management tools should be utilized. **Equipment used for personal (human) movement should not be used to move greater than 150kg loads.**

2.7 Raising

Loads may be raised utilizing simple haul systems. Backups are used with the same criteria as above with lowers.

The ID may be rigged from an anchor to perform as the haul clutch. This facilitates quick transitions between lowers and raises. The ID has higher friction than many other (purpose built) haul clutches.

Raising may be done redirected, from the top of a platform or from an anchor point. Raising from a platform is easier as the operator has their feet on a hard surface and may use this to create force. A common method is to use the body haul for lighter loads. The operator runs the rope through the ID and the attaches an ascender (handled or croll) on to the rope. The operator lowers their body weight on to the rope and does a 1:1 haul. The operator may pull up on the rope to the load to help with the raise.

Raising from an anchor point (pitch head hauling) is more difficult. The operator needs to be very organized so that the system does not get confused. It is usually easier to attach the operator to the anchor point nearest the loaded rope.

2.8 Pulley Systems and Understanding Mechanical advantages

Pulleys actually serve one of two purposes. They are either rigged to provide Mechanical advantage or simply to redirect and change direction of a rope.

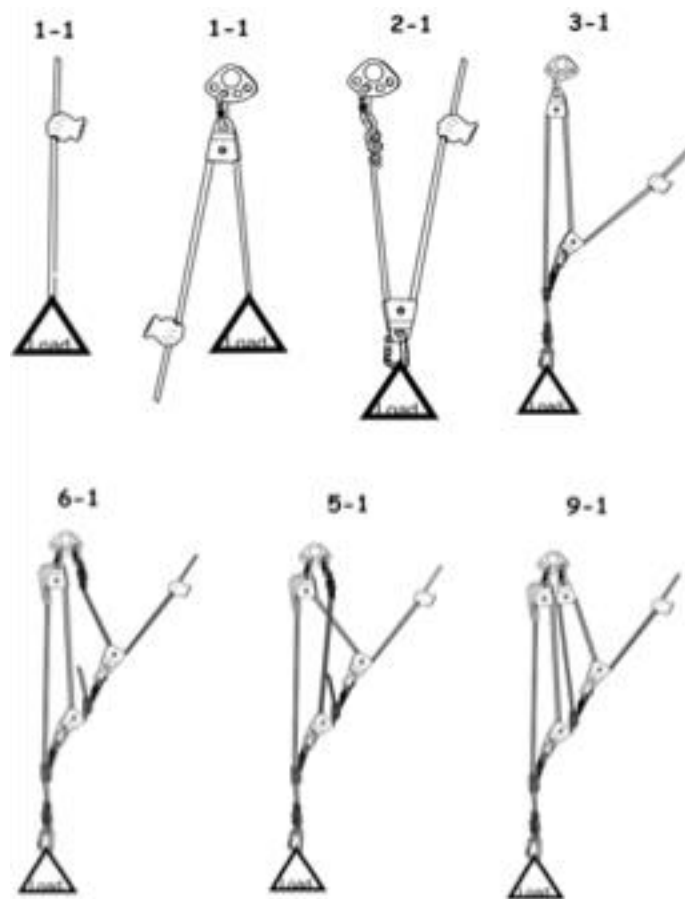
Pulley's that are fixed provide no mechanical advantage whereas pulleys that travel with the load do provide mechanical advantage.

Pulley system ratios are relationships between the weight of the load and the required effort to move the load.

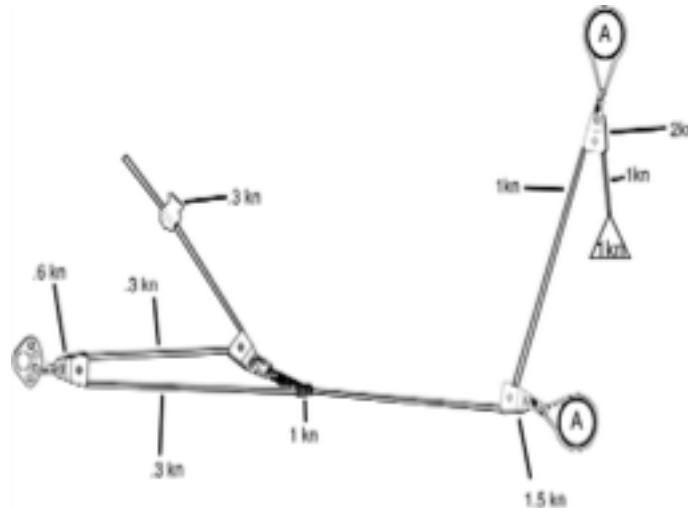
On a 2:1 system, each rope will be sharing the load requiring less effort to move the load. On a 100 pound weight, it would be as lifting only 50 pounds

Increasing ratios increases the power of the system backup, but also creates several drawbacks. In a 6:1 system, the rope must be pulley 6 feet in order for the casualty to be moved one foot. Also more friction develops over pulleys as the ratios are increased.

Common Mechanical Advantage Systems



2.9 Forces within simple rope systems



2.10 Tight Rope Rescue

Extra Equipment:

1 or 2 spare rescue ropes (with carabiner attached via Barrel knots)

1 Rescucender (or handled ascender)

1 Heavy steel carabiner

2 Large master point carabiners

**** new anchor slings may be helpful in this rescue****

- Ascend past casualty to anchor points (ascending casualty's load rope will position rescuer better for the raise)
- Set casualty's backup device as necessary
- Use ASAP as rescuer backup device for the climb when past the casualty
- Attach spare lanyard to backup anchor
- Attach sternal lanyard to main anchor
- Stand and transfer chest ascender from main (climbing) rope to backup lanyard
- Detach ASAP from rescuers sternal and attach to backup anchor. Reverse the ASAP on the rope (this becomes the casualty's belay)
- Rig the ID in to the load anchor
- Attach the rescue rope in to the ID
- Attach Rescucender and steel carabiner to rescue rope and assemble on the main rope
- Extend the Rescucender down to casualty
- Create haul system using the ID as a haul point. Use the croll-haul technique to pull and the handled ascender as a haul point

2.11 Tight Rope Rescue to full length lower

- Haul casualty to maximum possible height
- Attach casualty's spare lanyard to backup anchor point (as tightly as possible)
- Attach casualty's second lanyard to main anchor point (loosely, this lanyard should not be loaded)
- Lower out on ID to tension casualty's backup lanyard
- Clean up the casualty's working attachments. ID or croll and backup device
- Transfer the new rescue rope from the Rescucender attachment to the casualty's sternal
- Attach a new rescue belay rope (this may be the tail of the main rescue rope) to casualty sternal and transfer ASAP to this rope
- Perform a short haul to raise (unweight) the casualty's (loaded) backup lanyard
- Clean off the casualty's lanyards
- Redirect the ID and ASAP ropes and lower out

2.12 Cross Haul

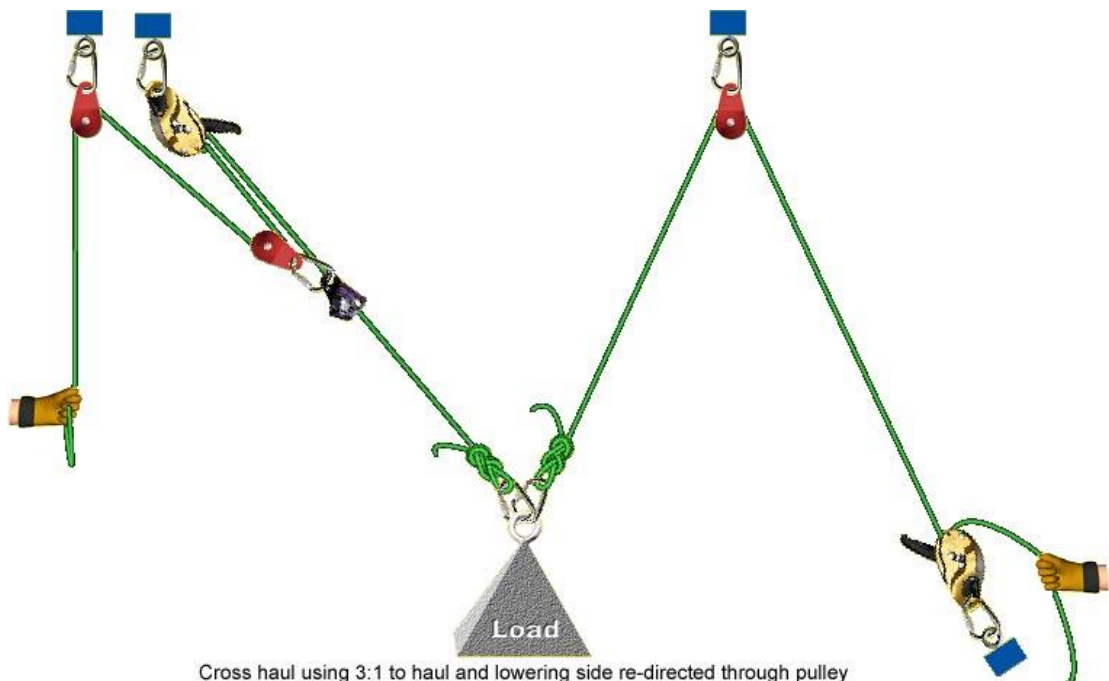
This exercise tests the knowledge of rigging, communication and skills, and will also demonstrate an ability to think and problem solve.

The basic premise is that a system is rigged to a load with multiple anchors and haul systems. These systems will enable the load (materials or human) to be hauled in any direction with hauling and lowering systems.

A good example of a cross haul would be to attach a casualty to two sets of ropes which the lowering and raising occurs by teams to position the casualty to a pre-determined location.

The cross haul may be done in two (2 anchor sets) or three dimensions (3 or more anchor sets). There is a need for dual ropes from each anchor for live loads or where there is potential to drop a dangerous load.

Anchor locations are critical for the cross haul. Anticipate force vectoring and loading. Anticipate the anchor points and their potential for sliding. Situate the haul person to best operate the system (anticipating angles and direction of travel).



Cross haul using 3:1 to haul and lowering side re-directed through pulley

2.13 Rigging

2.13.a Narrow Y hang

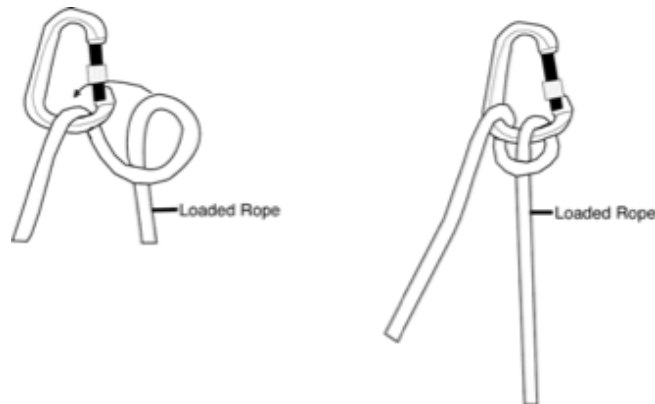
2.13.b Wide Y hang (over 6' doubled anchor points)

2.13.c Simple structural anchors

2.13.d Anchors pre-rigged to lower

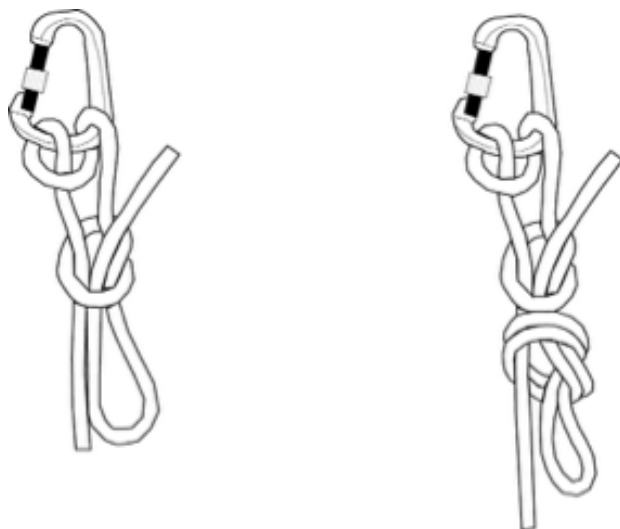
Load release hitches may be used as lowering systems or as a releasable component. The most common releasable anchor is the ID.

Another common release hitch is the Munter with blocking knot. The Munter may be used as a single, on two parallel carabiners, or as a Monster Munter depending on the frictions needed.



Blocking Knot

The tie-off or blocking knot is used to secure the release hitch under load. The tie utilizes a slip hitch as the initial tie (releases under load) and a secondary backup tie.



2.14 Pull-through Anchors

**** Rescues should not be performed on pull-through anchors****

This technique allows the technician to rig working anchors that may be pulled cleanly from the bottom of the work site.

Tie a figure 8 (or butterfly) into the center of the rope

Pass one end around anchor locations (make sure there are no sharp edges)

Clip a carabiner from the figure 8 loop to the working side of the rope. The rope may be inserted in to the eye of the figure 8 if there is danger of cross-loading the carabiner.

Pull end of rope until knot cinches against the anchor location

When connecting to the rope systems, make sure your working rope is the rope that is clipped to the carabiner or inserted into the eye.

There must be two ropes rigged in this fashion to perform work, load and backup.

Do not connect to retrieval ropes!

Upon completion, remove end knots and pull down on the retrieval side (do not leave a standing set of pull-throughs)
Danger of misuse

